Attorney's Docket No.: 07977-084002 / US3151D1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant :	Shunpei Yamazaki, et al.	Art Unit :	2871
Serial No. :	09/686,653	Examiner :	Mihn Ton
Filed :	October 10, 2000	Confirmation No.:	5915
		Notice of Allowance Date:	March 14, 2005
Title :	LIQUID CRYSTAL DISPLAY AND METHOD OF DRIVING SAME		

MAIL STOP ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO NOTICE OF ALLOWANCE

In response to the Notice of Allowance mailed March 14, 2005, enclosed are a completed issue fee transmittal form PTOL-85b and a check for $1430 for the required fee, including patent copies.

Applicants request confirmation of entry of the Amendment After Allowance filed April 28, 2005. Copies of the amendment as filed and the date-stamped post card are attached as evidence of the same. Applicants also request that the Examiner provide a supplemental Notice of Allowability to confirm that the allowed claims are claims 1, 3-7, 9-13, 15-19, 21-26, 28-34, 37, 39, 40, 43, 46, 47, 49-52, and 55-60.

Please apply any additional charges or credits to our Deposit Account No. 06-1050.

Respectfully submitted,

Date: June 14, 2005

John F. Hayden
Reg. No. 37,640

Customer No. 26171
Fish & Richardson P.C.
1425 K Street, N.W., 11th Floor
Washington, DC 20005-3500
Telephone: (202) 783-5070
Facsimile: (202) 783-2331

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Attorney's Docket No. 07977-084002	Client Reference No. US3151D1	Mailing Date April 28, 2005
Application No. 09/686,653	Filing Date October 10, 2000	Attorney/Secretary Init JFH/WXH/aum

Title of the Invention
LIQUID CRYSTAL DISPLAY AND METHOD OF DRIVING SAME

Applicant
Shunpei Yamazaki, et al.

Enclosures

- ☑ Amendment After Allowance Pursuant to 37 C.F.R. § 1.312 (17 pages)
- ☑ Request to Correct Notice of Allowability (1 page)
- ☑ Request for Initialed Corrected Form PTO-1449 (1 page)
- ☑ Form PTO-1449 (4 pages)

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AMENDMENT AFTER ALLOWANCE
PURSUANT TO 37 C.F.R. §1.312

Please amend the application as indicated on the following pages. This amendment is being filed prior to the payment of the issue fee.

Amendments to the Claims begin on page 2.

Remarks begin on page 17.

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Previously Presented). A method of driving a reflective type liquid crystal display device,

said reflective type liquid crystal display device comprising:

a first insulating substrate having transparency;

a reflecting layer;

a second insulating substrate being disposed opposite to the first insulating substrate, at least a part of said second insulating substrate covering the reflecting layer;

a first electrode being formed over the first insulating substrate;

a first conducting line for applying electrical signals to the first electrode, said first conducting line being formed over the first insulating substrate;

a first thin film transistor formed over the first insulating substrate as a switching element and electrically connected to the first electrode and the first conducting line,

said first thin film transistor comprising:

a crystalline semiconductor island formed over the first insulating substrate;

source and drain regions formed in the crystalline semiconductor island;

a gate electrode formed adjacent to the crystalline semiconductor island having a gate insulating film therebetween,

a pair of low concentration regions each being adjacent to the source and drain regions in the crystalline semiconductor island;

an interlayer insulating film covering the first thin film transistor, said interlayer insulating film being a multilayer film of silicon oxide and silicon nitride;

a second electrode being formed over the first insulating substrate, said second electrode being electrically insulated from the first electrode and from the first conducting line;

a second conducting line for applying electrical signals to the second electrode, said second conducting line being formed on the first insulating substrate;

a liquid crystal material being interposed between the first and second insulating substrates;

said method comprising the steps of:

producing a parallel electric field to the first insulating substrates, said parallel electric field being generated between the first and second electrodes, and

driving the liquid crystal material by the parallel electric field,

wherein the liquid crystal material is oriented in a hybrid alignment nematic mode.

2. (Cancelled)

3. (Previously Presented). A method according to claim 1,
wherein each of the first and second electrodes has transparency.

4. (Previously Presented). A method according to claim 1,
wherein the first and second electrodes are alternately protruding lines of electrodes which are nested in each other alternately with a given spacing therebetween.

5. (Previously Presented). A method according to claim 1,
wherein each of the first and second electrodes comprises ITO.

6. (Currently Amended). A method according to claim 1,
wherein each of <u>the</u> first and second insulating substrate is one selected from the group consisting of glass, quartz and polyethylene sulfate.

7. (Previously Presented). A method of driving a reflective type liquid crystal display device,

said reflective type liquid crystal display device comprising:

a first insulating substrate having transparency;

a reflecting layer;

a second insulating substrate being disposed opposite to the first insulating substrate, at least a part of said second insulating substrate covering the reflecting layer;

a first electrode being formed over the first insulating substrate;

a first conducting line for applying electrical signals to the first electrode, said first conducting line being formed over the first insulating substrate;

a first thin film transistor being formed over the first insulating substrate as a switching element and electrically connected to the first electrode and the first conducting line;

said first thin film transistor comprising:

a crystalline semiconductor island formed over the first insulating substrate;

source and drain regions formed in the crystalline semiconductor island;

a gate electrode formed adjacent to the crystalline semiconductor island having a gate insulating film therebetween,

a pair of low concentration regions each being adjacent to the source and drain regions in the crystalline semiconductor island;

a second thin film transistor formed over the first insulating substrate for driving the first thin film transistor;

an interlayer insulating film covering each of the first and second thin film transistors, said interlayer insulating film being a multilayer film of silicon oxide and silicon nitride;

a second electrode being formed over the first insulating substrate and electrically insulated from the first electrode and from the first conducting line;

a second conducting line for applying electrical signals to the second electrode, said second conducting line being formed over the first insulating substrate;

a biaxial film disposed over the first insulating substrate;

a polarizing plate disposed on the biaxial film;

a liquid crystal material being interposed between the first and second insulating substrates;

said method comprising the steps of:

producing a parallel electric field to the first insulating substrates, said parallel electric field being generated between the first and second electrodes, and

driving the liquid crystal material by the parallel electric field,

wherein the liquid crystal material is oriented in a hybrid alignment nematic mode.

8. (Cancelled)

9. (Previously Presented). A method according to claim 7, wherein each of the first and second electrodes has transparency.

10. (Previously Presented). A method according to claim 7, wherein the first and second electrodes are alternately protruding lines of electrodes which are nested in each other alternately with a given spacing therebetween.

11. (Previously Presented). A method according to claim 7, wherein each of the first and second electrodes comprises ITO.

12. (Currently Amended). A method according to claim 7, wherein each of <u>the</u> first and second insulating substrate is one selected from the group consisting of glass, quartz and polyethylene sulfate.

13. (Currently Amended). A method of driving a reflective type liquid crystal display device,

said reflective type liquid crystal display device comprising:

a first insulating substrate having transparency;

a second insulating substrate being disposed opposite to the first insulating substrate having a reflecting layer thereon;

a first electrode being formed over the first insulating substrate;

a first conducting line for applying electrical signals to the first electrode, said first conducting line being formed over the first insulating substrate;

a first thin film transistor being formed over the first insulating substrate as a switching element and electrically connected to the first electrode and the first conducting line;

said first thin film transistor comprising:

a crystalline semiconductor island formed over the first insulating substrate;

source and drain regions formed in the crystalline semiconductor island;

a gate electrode formed adjacent to the crystalline semiconductor island having a gate insulating film therebetween,

a pair of low concentration regions each being adjacent to the source and drain regions in the crystalline semiconductor island;

a second thin film transistor being formed over the first insulating substrate for driving the first thin film transistor, said second thin film transistor including an n-channel third thin film transistor and a p-channel fourth thin film transistor being connected to each other;

an interlayer insulating film covering each of the first and second thin film transistors, said interlayer insulating film being a multilayer film of silicon oxide and silicon nitride;

a second electrode being formed over the first insulating substrate and electrically insulated from the first electrode and from the first conducting line;

a second conducting line for applying electrical signals to the second electrode, said second conducting line being formed over the first insulating substrate;

a liquid crystal material being interposed between the first and second insulating substrates;

said method comprising the steps of:

producing a parallel electric field to the first insulating substrate[[s]], said parallel electric field being generated between the first and second electrodes, and

driving the liquid crystal material by the parallel electric field,

wherein the liquid crystal material is oriented in a hybrid alignment nematic mode,

wherein the liquid crystal material has a first orientation near the first insulating substrate while the liquid crystal material has a second orientation near the second insulating substrate, said second orientation being different from the first orientation.

14. (Cancelled)

15. (Previously Presented). A method according to claim 13, wherein each of the first and second electrodes has transparency.

16. (Previously Presented). A method according to claim 13, wherein the first and second electrodes are alternately protruding lines of electrodes which are nested in each other alternately with a given spacing therebetween.

17. (Previously Presented). A method according to claim 13, wherein each of the first and second electrodes comprises ITO.

18. (Previously Presented). A method according to claim 13, wherein each of the first and second insulating substrate is one selected from the group consisting of glass, quartz and polyethylene sulfate.

19. (Previously Presented). A method of driving a reflective type liquid crystal display device,

said reflective type liquid crystal display device comprising:

a first insulating substrate having transparency;

a second insulating substrate being disposed opposite to the first insulating substrate;

a reflecting layer on the second insulating substrate;

a first electrode being formed over the first insulating substrate;

a first conducting line for applying electrical signals to the first electrode, said first conducting line being formed over the first insulating substrate;

a first thin film transistor formed over the first insulating substrate as a switching element and electrically connected to the first electrode and the first conducting line;

said first thin film transistor comprising:

a crystalline semiconductor island formed over the first insulating substrate;

source and drain regions formed in the crystalline semiconductor island;

a gate electrode formed adjacent to the crystalline semiconductor island having a gate insulating film therebetween,

a pair of low concentration regions each being adjacent to the source and drain regions in the crystalline semiconductor island;

a second thin film transistor formed over the first insulating substrate for driving the first thin film transistor;

an interlayer insulating film covering each of the first and second thin film transistors, said interlayer insulating film being a multilayer film of silicon oxide and silicon nitride;

a second electrode being formed over the first insulating substrate and electrically insulated from the first electrode and from the first conducting line;

a second conducting line for applying electrical signals to the second electrode, said second conducting line being formed over the first insulating substrate;

a liquid crystal material being interposed between the first and second insulating substrates;

said method comprising the steps of:

producing a parallel electric field to the first insulating substrates, said parallel electric field being generated between the first and second electrodes, and

driving the liquid crystal material by the parallel electric field,

wherein the liquid crystal material is oriented in a hybrid alignment nematic mode,

wherein the liquid crystal material is oriented substantially horizontally to the first insulating substrate near the first insulating substrate while the liquid crystal material is oriented substantially vertically to the second insulating substrate near the second insulating substrate.

20. (Cancelled)

21. (Previously Presented). A method according to claim 19, wherein each of the first and second electrodes has transparency.

22. (Previously Presented). A method according to claim 19, wherein the first and second electrodes are alternately protruding lines of electrodes which are nested in each other alternately with a given spacing therebetween.

23. (Previously Presented). A method according to claim 19, wherein each of the first and second electrodes comprises ITO.

24. (Previously Presented). A method according to claim 19,

wherein each of the first and second insulating substrate is one selected from the group consisting of glass, quartz and polyethylene sulfate.

25. (Currently Amended). A method of driving a liquid crystal display device comprising:

a first substrate;

a second substrate being disposed opposite to the first ~~insulating~~ substrate,

a first electrode formed over the first ~~insulating~~ substrate;

a first conducting line for applying electrical signals to the first electrode, said first conducting line being formed over the first ~~insulating~~ substrate;

a second electrode, said second being electrically insulated from the first electrode and from the first conducting line;

a thin film transistor formed over the first substrate, said thin film transistor being electrically connected to the first electrode and the first conducting line; and

an interlayer insulating film covering the thin film transistor;

wherein said interlayer insulating film is a multilayer film comprising silicon oxide film and silicon nitride film;

wherein a liquid crystal material is interposed between said first substrate and said second substrate;

said method comprising:

producing a parallel electric field to the first ~~insulating~~ substrate[[s]], said parallel electric field being generated between the first and second electrodes, and

driving the liquid crystal material by the parallel electric field.

26. (Previously Presented). A method of driving a liquid crystal display device according to claim 25,

wherein the first and second electrodes have transparency.

27. (Cancelled).

28. (Previously Presented). A method of driving a liquid crystal display device according to claim 25,

wherein each of the first and second electrodes comprises ITO.

29. (Previously Presented). A method of driving a liquid crystal display device according to claim 25,

wherein a second conducting line for applying electrical signals to the second electrode is formed over the first insulating substrate.

30. (Currently Amended). A method of driving a liquid crystal display device according to claim 25,

wherein at least one of the first and second substrate is one selected from the group consisting of glass, quartz and polyethylene sulfate.

31. (Previously Presented). A method of driving a liquid crystal display device according to claim 25,

wherein at least one of first and second substrate has transparency.

32. (Previously Presented). A method of driving a liquid crystal display device according to claim 25,

wherein a reflecting layer is provided over said second substrate.

33. (Currently Amended). A method of driving a liquid crystal display device according to claim 25,

wherein said thin film transistor comprises:

a crystalline semiconductor island over the first ~~insulating~~ substrate;

source and drain regions formed in the crystalline semiconductor island; and

a gate electrode formed adjacent to the crystalline semiconductor island having a gate insulating film therebetween.

34. (Previously Presented). A method of driving a liquid crystal display device according to claim 33,

wherein the thin film transistor comprises a pair of low concentration regions adjacent to the source and drain regions in a crystalline semiconductor island, respectively.

35. (Cancelled).

36. (Cancelled).

37. (Previously Presented). A method of driving a liquid crystal display device according to claim 25,

wherein the liquid crystal material is oriented in a hybrid alignment nematic mode.

38. (Cancelled).

39. (Previously Presented). A method of driving a liquid crystal display device according to claim 25, further comprising:

a biaxial film disposed over the first substrate; and

a polarizing plate disposed over the biaxial film.

40. (Previously Presented). A method of driving a liquid crystal display device comprising:

a thin film transistor over a first substrate;

an interlayer insulating film provided over the thin film transistor; said interlayer insulating film being a multilayer film comprising silicon oxide film and silicon nitride film;

a wiring provided over said interlayer insulating film; a part extended from said wiring being electrically connected to the thin film transistor through a contact hole in said interlayer insulating film;

a first insulating film provided over a part of said interlayer insulating film and a part of said wiring;

a display electrode provided over said first insulating film; a part extended from said display electrode being electrically connected to the wiring through a contact hole in said first insulating film;

a second insulating film provided over said display electrode;

a common electrode provided over said second insulating film;

a liquid crystal material interposed between said first substrate and a second substrate;

said method comprising:

generating an electric field generated between the display and common electrodes; and

driving the liquid crystal material by the electric field.

41. (Cancelled).

42. (Cancelled).

43. (Previously Presented). A method of driving a liquid crystal display device according to claim 40,

wherein the first insulating film comprises silicon nitride film.

44. (Cancelled).

45. (Cancelled).

46. (Previously Presented). A method of driving a liquid crystal display device according to claim 40,

wherein said display electrode has transparency.

47. (Previously Presented). A method of driving a liquid crystal display device according to claim 40,

wherein said second insulating film comprises silicon nitride film.

48. (Cancelled).

49. (Previously Presented). A method of driving a liquid crystal display device according to claim 40,

wherein said common electrode has transparency.

50. (Previously Presented). A method of driving a liquid crystal display device according to claim 40,

wherein a black matrix is provided over said second insulating film.

51. (Previously Presented). A method of driving a liquid crystal display device according to claim 40,

wherein said thin film transistor comprises:

a crystalline semiconductor island;

source and drain regions formed in the crystalline semiconductor island; and

a gate electrode formed adjacent to the crystalline semiconductor island having a gate insulating film therebetween.

52. (Previously Presented). A method of driving a liquid crystal display device according to claim 51,

wherein the thin film transistor comprises a pair of low concentration regions adjacent to the source and drain regions in a crystalline semiconductor island, respectively.

53. (Cancelled).

54. (Cancelled).

55. (Previously Presented). A method of driving a liquid crystal display device according to claim 40,

wherein the liquid crystal material is oriented in a hybrid alignment nematic mode.

56. (Previously Presented). A method of driving a liquid crystal display device according to claim 40,

wherein at least one of first and second substrate is one selected from the group consisting of glass, quartz and polyethylene sulfate.

57. (Previously Presented). A method of driving a liquid crystal display device according to claim 40,

wherein the display and common electrodes are provided each other alternately with a given spacing therebetween over the first substrate.

58. (Previously Presented). A method of driving a liquid crystal display device according to claim 40,

wherein a reflecting layer is provided over the second substrate.

59. (Previously Presented). A method of driving a liquid crystal display device according to claim 40,

wherein a rubbing direction at a polyimide film provided over the first substrate is parallel to teeth of said display and common electrodes.

60. (Currently Amended). A method of driving a liquid crystal display device according to claim [[54]]<u>40</u>, further comprising:

a biaxial film disposed over the first insulating substrate; and

a polarizing plate disposed over the biaxial film.

REMARKS

Claims 1, 3-7, 9-13, 15-19, 21-26, 28-34, 37, 39-40, 43, 46-47, 49-52, and 55-60 remain pending and allowed. Claims 6, 12, 13, 25, 30, 33, and 60 have been amended merely to correct minor typographical errors. No new matter has been introduced.

No fee is believed to be due at this time. Please apply any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: April 28, 2005

William G. Hughes, Jr.
Reg. No. 46,112

Fish & Richardson P.C.
1425 K Street, N.W.
11th Floor
Washington, DC 20005-3500
Telephone: (202) 783-5070
Facsimile: (202) 783-2331

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REQUEST TO CORRECT NOTICE OF ALLOWABILITY

With regard to the Notice of Allowability mailed March 14, 2005, applicants note that the allowed claims were incorrectly listed on the Form PTOL-37 as 1, 3-7, 9-13, 15-19, 26-28, 34, 29, 40, 43, 46-52 and 55-60. Applicants request that the correct listing of the allowed claims be changed to: 1, 3-7, 9-13, 15-19, **21-26, 28-34, 37, 39-40, 43, 46-47, 49-52**, and 55-60 as correctly listed under the "REASONS FOR ALLOWANCE" on the Notice of Allowability mailed March 14, 2005 (page 2), and as evidenced by the Amendment filed June 21, 2004. A copy of the original Notice of Allowability showing the desired changes in red ink is attached for your convenience.

No fee is believed to be due. If, however, there are any charges or credits, please apply them to Deposit Account No. 06-1050.

Respectfully submitted,

Date: April 28, 2005

William G. Hughes, Jr.
Reg. No. 46,112

Fish & Richardson P.C.
1425 K Street, N.W.
11th Floor
Washington, DC 20005-3500
Telephone: (202) 783-5070
Facsimile: (202) 783-2331

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